CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
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Project Number
31882

Project Title
To Which Antibiotic Does E. coli Show the Most Resistance? Amoxicillin or Tetracycline?

Abstract

Objectives/Goals
The goal/objective of my experimentation was to determine which of two commonly prescribed antibiotics, Amoxicillin or Tetracycline, would yield the greatest antibiotic resistance levels in E. Coli.

Methods/Materials
Three samples of E. Coli bacteria, cultured on a nutrient agar Petri dish, were dosed with either Tetracycline, Amoxicillin, or distilled water, with antibiotic solutions consisting of 1mg of antibiotic to 10mL of distilled water. The antibiotic dosages were applied to filter disks and were centered in the E. Coli cultured dishes. Each sample was then incubated for 24 consecutive hours at 37 degrees centigrade. At the end of the incubation period, the diameter of each inhibition zone was measured and recorded in millimeters. This process was then repeated for another three generations, and the entire experiment was conducted in three trials.

Results
The control samples (distilled water) showed no signs of an inhibition zone, and subsequently, no decrease in inhibition zone size. E. Coli samples treated with Amoxicillin, showed a decrease in inhibition zone size from; Generation 1-2, 15%, Generation 3, 25%, and Generation 4, 24%. E. Coli samples treated with Tetracycline, showed the greatest decrease in inhibition zone size from; Generation 1-2, 17%, Generation 3, 27%, and Generation 4, 28%.

Conclusions/Discussion
The result of the experiment showed that the E. Coli bacteria displayed the greatest resistance to Tetracycline. This outcome contradicts the hypothesis that E. Coli would show the greatest resistance to Amoxicillin. This hypothesis was formed based on the assumption that Amoxicillin, being a weaker and more limited spectrum antibiotic in comparison to Tetracycline would yield the greatest resistance. Through multiple observations and the resulted outcome of the experiment, two conclusions can be made. In the first generation of the cultures, the E. Coli bacteria exposed to Tetracycline yielded the greatest inhibition zone sizes. Thus it can be concluded that the stronger the antibiotic the stronger the resistance levels. Furthermore it can be concluded that different classes of antibiotics have unique properties in the way they destroy bacteria. That said: E. Coli may be more tolerant to one method of destruction (antibiotic) than others.

Summary Statement
This study examined the resistance strength of E. Coli bacteria against two commonly prescribed antibiotics, Amoxicillin and Tetracycline.

Help Received
Pierce College provided me with the E. Coli in LB medium.